It still does not seem to be worthwhile to grind through all 648 combinations, but, in response to AT&T's comment, additional sensitivity analysis was performed to explore parameter values that lead to low values of the percentage of additional SFAS 106 costs to be met from other sources (which is 84.8% in the baseline case). The additional sensitivity analysis was performed as follows: Four of the parameters were each set at the value that led to the largest increase in GNP-PI when the parameters were varied one at a time. (Price elasticity of demand - 3.0; share of labor costs in total cost, sector 1 - 0.78; share of labor costs in total cost, sector 2 - 0.78; initial fraction of labor employed in sector 2 - 0.4.) While these four parameters were set at values that individually contributed to the largest impact on GNP-PI, each of the four values of the labor supply elasticity was examined in combination with each of the three values of the direct impact on labor costs in sector 2. The results of this additional sensitivity analysis are reported in Appendix C. Notice that the lowest value obtained for the percentage of additional SFAS 106 costs to be met from other sources is 60.1%. This number was obtained by combining unlikely and extreme values of all 6 parameters. The chance that all 6 of these parameters simultaneously take on such extreme values is essentially negligible. Whereas the finding in the Godwins Report that 84.8% of additional SFAS 106 costs need to be met from other sources should be regarded as a conservative estimate, the 60.1% figure should be regarded as an unrealistically low underestimate of the amount requiring recovery from other sources.

AT&T Contention - (Pages 12-13)

"Because the SFAS 106 accrual is inherently imprecise and measurement of its impact on the economy is extremely difficult to assess, it is not possible to predict the full extent that SFAS 106 will affect prices in the economy generally (as both Godwins and NERA attempt to do).*" [footnote omitted]

Godwins

Response - The Godwins Report explicitly recognizes that there are uncertainties associated with the calculation of the effects of the introduction of SFAS 106, and deals with these uncertainties in two ways: (1) whenever a decision needs to be made about the numerical value of some data or parameter, the Godwins Report always attempts to err on the side of overstating the impact on GNP-PI of the introduction of SFAS 106. In the macroeconomic analysis, this conservative approach is represented by the choice of baseline values of the price elasticity of demand and the labor supply elasticity that are likely to be higher than the true values of these parameters, as explained on pages 29 and 30, respectively, of the Godwins Report. (In the actuarial analysis, this same conservative approach is noted in footnote 4 on page 16 of this Report.) This conservative approach lends additional support to the finding that SFAS 106 will have a tiny effect on GNP-PI, because even the small effect predicted by Godwins is probably an overstatement of the true effect. (2) Recognizing the uncertainty associated with the data and parameters, Godwins devoted an entire section of its report (Section IV) to sensitivity analysis. Again, the sensitivity analysis lends additional support to the conclusion that the introduction of SFAS 106 has only a tiny effect on GNP-PI.

Godwins

C. **Details of Specification of the Macroeconomic Model**

MCI raised three questions concerning the detailed specification of the model.

MCI Contention -
(Page 32)

MCI asserts that the USTA model assumes among other things "perfect substitutability of capital and labor."

Response -

This assertion is plain wrong. The most common measure of the substitutability of capital and labor is the elasticity of substitution between capital and labor. "Perfect substitutability" describes the situation in which the value of this elasticity of substitution is infinite. In the USTA model, the value of this elasticity of substitution is equal to one, rather than infinity, as implied by MCI's assertion.

MCI Contention -
(Page 33)

MCI states (correctly) that the model "has no international sector."

Response -

Every economic model is a simplification of reality. As a practical matter, a usable model must ignore many aspects of reality. The skill in building a good model rests in including those aspects of reality that are quantitatively important for the issues being studied, and in ignoring those aspects of reality that are less quantitatively important for the issues being studied. Despite all the attention that international trade and foreign competition receive in the press, it must be remembered that international trade is a small part of U.S. GNP. In 1991, net exports were equal to 0.5% of GNP in the U.S. (net exports were negative, so it is the magnitude, or absolute value, of net exports that was 0.5% of GNP). Even looking at gross trade flows rather than the net flow, imports accounted for only 10.9% of GNP, and exports accounted for

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only 10.4% of GNP in 1991. Thus, the inclusion of an international sector did not seem important to study the impact of SFAS 106, and there is nothing convincing in the MCI statement that would lead to revising this judgment.

MCI Contention - (Page 33)

"Finally, although the model is attempting to review a dynamic phenomenon, the structure of the model is static in form."

Response -

Rather than being a weakness, the static nature of the model is a virtue. There is quite a bit of disagreement among macroeconomists about the short-run dynamic behavior of the macroeconomy, and indeed economists seem to have a lot of trouble predicting short-run dynamic behavior, such as turning points in the business cycle. Because the prediction of short-run macroeconomic behavior is so difficult, it was decided to avoid this task, and instead to analyze the ultimate effects of SFAS 106 when the economy reaches a new equilibrium. A static model, which simply avoids difficult short-run dynamics, is appropriate for analyzing the ultimate effects of the introduction of SFAS 106. As stated in the Godwins Report (p. 26), "The model is best viewed as a long-run model that fully incorporates the effects of SFAS 106." An additional advantage of focusing on the "long-run" or full effect of SFAS 106 is that it probably overstates the short-run impact on GNP-PI of the introduction of SFAS 106 because, owing to various lags in the economy's adjustment process, short-run effects are generally smaller than long-run effects. This likely overstatement of the impact of SFAS 106 is consistent with the conservative approach of the Godwins Report, which is to guard against understating the impact on GNP-PI of SFAS 106.

D. **Response to Comments of Independent Macroeconomist on the Model and its Results**

The statement below represents the entire commentary on the macroeconomic model by an independent economist engaged by MCI.

MCI (Drazen) -
(Pages 8-9)

"The USTA study also presents a macroeconomic model to estimate the effect of SFAS 106 on the GNP Price Index (GNP-PI) to see what fraction of costs will be recovered via the increase in GNP-PI. The macroeconomic model is theoretically correct, but a very highly simplified and abstract model of the U.S. economy. For example, there are assumed to be only two aggregate factors of production, total capital and total labor, and the whole economy is assumed to be perfectly competitive. Hence, the true effect of SFAS 106 on the GNP-PI may be significantly different (in a statistical sense, though probably not in order of magnitude) than the figure of 0.0124% that is presented. The true effect on the average wage rate in the economy may also be very different than what the very simple macroeconomic model predicts, both in terms of statistical significance and in terms of order of magnitude."

Response -

This statement is clearly and carefully written by Allan Drazen, a well-respected economist. The remarks below are presented to help non-economists interpret some of the economic jargon used by Drazen.

Drazen's assertion that the "macroeconomic model is theoretically correct" should be regarded as praise, since this judgment comes from a macroeconomist who has published many of his own theoretical models. To an economist, the statement that the model is theoretically correct indicates that the basic economics underlying the model is sound, and that the mathematical formulation of the model is an appropriate formalization of the economics.

Although Drazen certifies the model as theoretically correct, he points out that it is "very highly simplified and abstract." Whether "very highly simplified and

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abstract" is a virtue or a vice depends on the benefits and drawbacks associated with simplification and abstraction. In this case, simplification and abstraction has the benefit of allowing the model to be a tractable representation of the important economic phenomena associated with an increase in labor costs, such as that associated with the introduction of SFAS 106. In addition to promoting tractability, the simplification avoids the possibility that irrelevant complications somehow contaminate the model's results.

Drazen's statement focuses on the drawbacks of simplification and abstraction in this case. As will be explained below, a careful reading of Drazen's statement indicates that he thinks that, despite the simplification and abstraction, the Godwins model produced essentially the right answer for the effect on GNP-PI, but he has some doubt about the effect on the wage rate.

The key to understanding Drazen's statement lies in the parenthetical statement in the quote "may be significantly different (in a statistical sense, though probably not in order of magnitude)". Economists often distinguish between two concepts of significance: statistical significance vs. economic significance. For instance, the true effect of something is said to be statistically significantly different from the estimated effect if econometric and/or statistical analyses indicate that we can have a high degree of confidence (usually 95% confidence) that the true effect is different from the estimated effect. It is possible that the estimated effect is very close to the true effect, and yet statistical and/or econometric methods may detect a statistically significant difference; in this case, economists would describe the difference as

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statistically   significant,   but   not   economically
significant.

Drazen's statement indicates that the true effect of SFAS
106 on GNP-PI may be statistically significantly different
-- but not economically significantly different -- from the
effect estimated by the Godwins model. He states that the
true effect on GNP-PI is probably not different, in order
of magnitude, from the 0.0124% effect estimated by Godwins.
That is, the order of magnitude of the Godwins estimate is
tiny, and Drazen does not dispute the finding of a tiny
effect on GNP-PI.

The calculated effect of SFAS 106 on the wage rate is
almost two orders of magnitude larger than the calculated
effect on GNP-PI, and Drazen suggests that the true effect
on the wage rate may differ from the calculated effect,
both in terms of statistical significance, and in terms of
order of magnitude. However, he does not indicate whether
the effect calculated by Godwins is likely to be too large
or too small.

To summarize, Drazen's remarks about the macroeconomic
results of the Godwins Report serve as much to bolster the
results as to challenge them.   Drazen pronounces the
macroeconomic model to be theoretically correct and he
notes, but does not challenge, the finding of a tiny impact
on GNP-PI. Finally, he does not indicate whether his
doubts about the effects on the wage rate would lead him to
expect a larger or a smaller effect than is found in the
Godwins Report.

E. Response to Ad Hoc Users

The criticisms of the macroeconomic analysis in the Godwins Report presented in The Opposition of the Ad Hoc Telecommunications Users Committee to Direct Cases is simply a summary of criticisms made in a report prepared by Economics and Technology, Inc. (ETI) for the International Communications Association. To avoid repetition, we will not separately respond to the Opposition of the Ad Hoc Telecommunications Users Committee report, and to the ETI report. Instead, we will respond only to the ETI report. Responding to the ETI report presents a special challenge. Unlike the oppositions filed by AT&T, MCI, and the remainder of the Ad Hoc Users filing, the report submitted by ETI is unprofessional in both its tone and its substance. When reading the assertions that appear instead of reasoned economic analysis, one wonders why ETI chose to write the report this way. Was it the result of an inability to understand the economic analysis in the Godwins Report, or was it the result of a deliberate attempt to misrepresent and distort the report? Regardless of the reason, ETI's reckless assertions have been entered into the record, so it is necessary to set them straight.

ETI asserts on page 13 of its report that the Godwins Report contains at least six fatal flaws. The first alleged fatal flaw deals with the role of calibration, and the remaining five alleged fatal flaws are numbered 1 - 5 on page 15 of the ETI report.

ETI Contention - (Page 14)

"In the Godwins model, the key numbers which determine the results are simply invented. They are made up. ... A quote from Appendix C-5 of the Godwins Report illustrates the process:

> The model is *calibrated* so that in the absence of FAS-106 it yields an allocation of labor across sectors...It is also *calibrated* such that in the absence of FAS-106, all nominal prices are equal to one." [emphasis added by ETI]

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Response -   Several comments are in order. First, let's look at what ETI omitted from the quoted passage from the Godwins Report where the ellipsis appears after "labor across sectors." The following words were left out: "that <u>matches the actual allocation</u> of labor across sectors." [emphasis added] Now why were these nine words omitted by ETI? Certainly not because they took up too much extra space. And certainly not because these nine words were not germane to the point ETI was trying to make. Quite the contrary--these nine words indicate that the numbers were not made up or invented; the numerical values of the parameters were chosen so that the share of workers eligible for SFAS 106 benefits in the model <u>would equal the actual share in the U.S. economy</u>. That is, these nine words prove the opposite of ETI's assertion, and ETI simply chose to suppress them.

Second, the passage quoted from the Godwins Report states that in the initial equilibrium, before the introduction of SFAS 106, all nominal prices are set equal to one. It seems that the authors of the ETI report regard this as an invented number. However, there is a difference between a price index and the price of a specific good measured in local currency. GNP-PI is a price index, and like all indexes, a single specific numerical value of the index is meaningless, unless the scale or base is specified. The value of an index in a base year is entirely arbitrary, and to make the interpretation of the numbers simple, the price indexes were normalized so that the price index in the initial situation had a value of one. The concept of normalization should be familiar to anyone with graduate training in economics, and there is no meaningful sense in which normalization should be interpreted as "inventing numbers."

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Third, ETI italicizes the word "calibrated" twice in the quoted passage, as if to emphasize that "calibrated" means "invented" or "made up." The problem is that the authors of the ETI report do not appear to know what calibration is. They ask the question on page 14: "What is this calibration?" Then they assert that calibration does not involve real economic data, and they cite as proof the fact that the term calibration is not used in standard econometrics textbooks. The problem is that the authors looked in the wrong place to find out about calibration. The right place to look is in the macroeconomics literature, in particular the burgeoning literature on quantitative general equilibrium macroeconomic models. An influential paper that uses calibration and is already becoming a classic in this literature is Edward C. Prescott's "Theory Ahead of Business Cycle Measurement," Quarterly Review, Federal Reserve Bank of Minneapolis, Fall 1986, pp. 9-22. Calibration is at the frontier of quantitative macroeconomics and has not yet filtered into many undergraduate textbooks. However, calibration is described in Chapter 11 of Macroeconomics by Andrew B. Abel and Ben S. Bernanke, Addison-Wesley Publishing Co., 1992, a book co-authored by one of the authors of the Godwins Report and used at dozens of leading colleges and universities.

Calibration is an alternative method to direct econometric estimation for choosing numerical values of parameters in a macroeconomic model. In calibrated models, numerical values may be based on econometric estimation of microeconomic data and/or they may be chosen so that variables in the model match actual values of real economic data. Both of these techniques were used in the model in the Godwins Report. For instance, the parameters of the

production functions were calibrated so that the share of labor cost in total cost matched the actual share of labor in total cost in the U.S. economy. Contrary to the assertion in the first paragraph on page 14 of the ETI report ["Another key factor, the labor supply elasticity, the response of labor supplied to real wage changes, is assumed to be 0.00, again a number simply invented for the purposes of their report."], the value of the labor supply elasticity was based on a multitude of econometric studies. The first complete paragraph on page 30 of the Godwins Report discusses the summary by Mark R. Killingsworth of the extensive econometric literature on the elasticity of labor supply. Each of the many studies finds different numerical values for this elasticity, and it seems pointless to try to pick one of the estimates in one of the studies. It is even more pointless to econometrically estimate this elasticity independently, given the multitude of existing estimates. The sensible approach is to observe that the estimates tend to show a small, even slightly negative, elasticity. Because the impact of SFAS 106 on the GNP-PI is larger for higher labor supply elasticities, a value of 0.0 was chosen so as not to understate the impact on GNP-PI. Furthermore, the sensitivity analysis explored the effect of even higher values of this elasticity.

It should be acknowledged that the value of one parameter, the price elasticity of demand, was not directly calibrated from a specific set of data or a specific set of econometric studies. The value of this parameter was chosen by observing that econometric studies of the demands for various goods tend to find price elasticities of demand on the order of one, or smaller. For instance, the ETI report on page 16 cites a price elasticity of demand of 0.723 for interstate switched access in a study by

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J. Gatto, et. al. of AT&T. Because price elasticities of demand tend to be smaller for broader categories of goods, the price elasticities of demand for sectors 1 and 2 in the Godwins model (which account for about 2/3 and 1/3 of private sector output, respectively) are most likely smaller than one. The baseline calculation used an elasticity of 1.5 because experimentation with the model indicated that the effect of SFAS 106 on GNP-PI is (1) not very sensitive to the price elasticity of demand, and (2) higher for higher values of the price elasticity of demand. Therefore, to provide a cushion against understating the effects on GNP-PI, the value of the price elasticity of demand was purposely set higher than the likely true value of this elasticity.

The ETI report complains that only "after much evasion" (p. 14) did the May, 1992 Godwins Response to Paragraph 16 of the FCC Order of Investigation and Suspension admit that its model is not econometrically estimated. The first paragraph of the May Response states that the original Godwins Report contained enough information so that a well-trained professional economist could reproduce the numerical results of the macroeconomic model. The second paragraph begins by pointing out that it would be helpful to contrast the model in the Godwins Report with conventional large-scale short-run econometric forecasting models. This is clearly not evasive.

Having addressed the ETI report's misrepresentation of calibration, we now discuss the five numbered alleged flaws.

ETI Contention -   "Godwins choose (sic) the wrong kind of model to evaluate
(Page 16)   the effects of FAS 106."

Response -   According to ETI, a large-scale commercial econometric
                    model would have been preferable to a classical general
                    equilibrium model for the purpose of analyzing the impact
                    of SFAS 106. The May, 1992 Godwins Response to Paragraph
                    16 of the FCC Order of Investigation and Suspension has
                    already addressed in detail the choice of a classical
                    general equilibrium model rather than a large-scale
                    commercial econometric forecasting model. ETI has already
                    complained on page 14 that that response contained
                    "duplication of material from the February report" so that
                    discussion will not be repeated here. It should be noted,
                    however, that the Godwins Report listed five desirable
                    criteria for a model to use in addressing the impact of
                    SFAS 106. The classical general equilibrium model used in
                    the Godwins Report meets all five of these criteria, but as
                    pointed out in the Godwins Response to Paragraph 16,
                    large-scale commercial econometric forecasting models fail
                    to meet at least two of these criteria.

                    ETI's discussion on pages 16-18 adds nothing of substance
                    to the issue of choosing an appropriate type of model. The
                    distinction drawn on page 16 between mathematical models
                    and models explicitly designed to be estimated with actual
                    data again reveals the authors' ignorance of the burgeoning
                    macroeconomic literature on quantitative general
                    equilibrium models. (See especially the sentence on page
                    16: "They are designed and studied to investigate a
                    concept qualitatively *not quantitatively*." [italics in
                    original]). The authors waste a few paragraphs on pages 17
                    and 18 deriding the monopolistic competition in the
                    Blanchard-Kiyotaki model. Apparently they have failed to
                    realize that monopolistic competition is one aspect of the

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Blanchard-Kiyotaki model that is not present in the adaptation of this model used in the Godwins Report.

ETI Contention -   "The key numerical parameters of the model are invented by
(Page 18)   Godwins and not estimated from any economic database."

Response -   There is nothing new in this false assertion that has not
                      already been addressed in this Supplemental Report. All of
                      this material in this false assertion is a repetition based
                      on the ignorance of calibration by the authors of the ETI
                      Report.

ETI Contention -   "The Godwins model erroneously assumes that workers do not
(Page 19)   evaluate the value from post-retirement benefits and that
                      employers do not view these benefits as current costs."

Response -   Page 19 of the ETI report states "The fundamental Godwins
                      assumption is that employers who pay these post-retirement
                      benefits do not now consider them labor costs." This
                      quoted sentence presumably means that the Godwins Report
                      assumes that, in the absence of SFAS 106, employers do not
                      recognize post-retirement benefits as current costs. The
                      reason for this assumption is that the Godwins Report
                      attempted to take a conservative approach wherever
                      possible. In this particular context, conservative means
                      guarding against understating the impact of SFAS 106 on
                      GNP-PI. Equivalently, the approach was to err on the side
                      of overstating the impact on GNP-PI. Now if one argues
                      that in the absence of SFAS 106 employers and employees
                      fully recognize post-retirement benefits, then the
                      introduction of SFAS 106 would have no effect on any
                      prices, and the GNP-PI would be unaffected. Thus, GNP-PI
                      would provide absolutely no recovery to Price Cap LECs who
                      would then be entitled to seek 100% recovery of the
                      increase in costs due to SFAS 106 because Price Cap LECs
                      have not been able to recover these costs in the past.

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However, to the extent that SFAS 106 formalizes and focuses attention on future post-retirement liabilities, and to the extent that firms carry larger liabilities on their balance sheets and thus face higher costs of borrowing, the introduction of SFAS 106 will lead to an increase in recognized current costs. How large is the increase in costs? As explained above, the conservative approach dictates that we overstate the effect of SFAS 106 on GNP-PI, so for macroeconomic purposes we treat all of the additional SFAS 106 expense as a cost.

ETI Contention -   "Next, the Godwins model incorrectly uses an outdated
(Page 20)   functional form to represent the production function for
                          the economy."

Response -   Although the Cobb-Douglas production function was first used more than 60 years ago, it is still widely used in quantitative economic analysis, and one of its major predictions -- that factor shares are constant over time -- seems to hold up well in U.S. data. It is true that during the 1970s there was a flurry of activity to generalize the Cobb-Douglas production function, and this flurry included estimation of the translog production function cited in footnote 48 of the ETI report. The translog production function is considerably more general than the Cobb-Douglas production function, but this added generality comes at a cost. The translog production function has many more parameters to estimate or calibrate, and the quality of aggregate data on inputs may be sufficiently poor to make estimates of these additional parameters unreliable. It is worth noting that when these additional parameters are equal to zero, the translog production function becomes a Cobb-Douglas production function. In practice, estimates of many of these additional parameters have large standard errors and are not significantly different from zero at

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standard confidence levels (see Ernst R. Berndt, The Practice of Econometrics: Classic and Contemporary, Reading Massachusetts: Addison-Wesley Publishing Co., 1990, Table 9.2 p. 473). In addition, the estimated elasticity of substitution between capital and labor, in a four-factor translog production function presented by Berndt on p. 475, is 0.97, which is very close to the elasticity of substitution of 1.0 that is characteristic of the Cobb-Douglas production function.

The ETI report closes its criticism of the use of the Cobb-Douglas production function on page 21 with the sentence, "Although it is not clear how significant the bias is from the use of the Cobb-Douglas model, it is clear that the analysis involves simplified assumptions dating back over 60 years." It is worth noting that not only does the ETI report admit that the significance of the bias is unclear, it does not speculate on the direction of any bias. The only thing that is clear to the authors of the ETI report is that the Cobb-Douglas production function is over 60 years old. Interestingly enough, the source cited in the ETI report states that the translog production function introduced in 1970 is "identical to the production function considered by Heady several decades earlier." (Berndt, p. 458)

Perhaps the best response to the criticism raised by the ETI report is contained in a 1988 book by Zvi Griliches (former Chairman of the Department of Economics at Harvard University, 1984 Vice President of the American Economic Association, 1965 winner of the John Bates Clark Medal for the best economist under the age of 40, and Fellow of the Econometric Society whose distinguished career has been devoted to the study of productivity): "There is also the issue of functional form for the estimated production

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functions and the associated productivity computations. I could never take this range of issues seriously." (Zvi Griliches, <u>Technology, Education, and Productivity</u>, New York: Basil Blackwell Inc., 1988, pp. 306-307.)

<u>ETI Contention</u> -
(Page 21)

"Finally, the Godwins Report ignores the usual uncertainty that is associated with survey results measured by calculated standard errors."

<u>Response</u> -

This criticism applies to the actuarial analysis and has been addressed on pp. 10-11 of this Supplemental Report.

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F. Response to Miscellaneous Comment by MCI

MCI Contention -
(Page 6,
and FN 8)

"If exogenous treatment is afforded to one portion of the compensation package, an asymmetrical relationship will be afforded carriers under price caps. This will allow carriers to offer increased OPEB, for which they would receive exogenous treatment, and decrease other forms of compensation.[8] (footnote 8: In fact, the USTA study itself predicts a similar situation where SFAS-106 costs increase, the wage rate in the economy will fall, offsetting the increase in labor costs associated with SFAS-106.)"

Response -

Here it is appropriate to comment only on footnote 8.

In the Godwins Report prepared for USTA, the introduction of SFAS 106 leads to a reduction in the wage rate, relative to the wage rate that would have prevailed in the absence of SFAS 106. The fall in the wage rate is not a consequence of "an asymmetrical relationship [that] will be afforded carriers under price caps." The wage rate falls for all firms in the economy, even those firms that do not offer OPEBs covered by SFAS 106. The predicted nationwide fall in the wage rate is a market equilibrium phenomenon reflecting the nationwide fall in the demand for labor at any given wage rate, as explained on page 24 of the Godwins Report. Because the fall in the wage rate is an equilibrium phenomenon, it is beyond the control of any single firm or small group of firms.

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Appendix A

Calculation of "Standard Error" of Average BLI
(Description of Methodology)

In response to a contention raised by the Ad Hoc Telecommunications Users Committee, we have provided an analysis which was performed to determine whether "the uncertainty that is associated with survey results" could have materially affected the results outlined in the Godwins Report. The methodology employed in that analysis is described below.

The Godwins BLI database is extensive (830 plans in all) and holds data on Plans for 18 million participants out of a universe of 38 million participants. Statistical sampling error should have been minor. Godwins tested this hypothesis by calculating standard errors for the pre-65 and post-65 average BLI's. The analysis took account of the six industry groups used in the USTA Report, the BLI weightings within each industry group, the weightings of the industry-group BLI's in developing the final averages, and of the finite universe effect whereby dispersion tends to zero when a sample enlarges to exhaust the universe.

For each industry group (i-1, i-2, ... i-6) a variance was calculated for the set of BLI_j's (j-1, N_i) observed for the group, N_i being the number of Plans in the Godwins database for industry group i. Weighted means were used in the USTA study, and the variance for the weighted mean for industry group i was calculated as the variance of the observed BLI_j's times the sum of the squares of the weights based on participant counts in the plans included in the industry group. The Godwins database has information for substantial percentages of covered employees in each industry group. The total number of plans in each industry group, T_i, was taken as the number of plans in the Godwins database for the industry group, N_i, times the ratio of covered employment for the industry group in the economy (a GAO figure) to the covered employment included in the Godwins database for the industry group. A standard adjustment factor of $(T_i - N_i) / (T_i - 1)$ was applied to account for the "finite universe effect".

The estimate of the variance of the means was taken as the sum of the products of the square of the "GAO weights" times the estimates of the industry-group variances. The square root of the estimate is the measure of the dispersion of the means. Numerical results from the calculations are summarized on the chart attached hereto. We see that pre-65 and post-65 dispersions are minor when contrasted to their corresponding means.

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Calculation of "Standard Error" of Average BLI's
(Results)

Industry Group number:	(1)	(2)	(3)	(4)	(5)	(6)	Total
Number of Plans in GODWINS' database:	446	6	78	31	222	47	830
Number of Employees covered by such Plans:	11,129,686	94,893	1,472,589	1,884,054	3,549,719	780,402	18,911,343
Number of covered employees in economy (GAO):	11,602,872	562,891	8,853,209	3,962,734	10,431,800	3,040,556	38,454,062

Pre Age 65

	(1)	(2)	(3)	(4)	(5)	(6)	Total
Weighted mean BLI for group:	0.7232	0.7758	0.7974	0.4730	0.6721	0.5771	0.6898
Variance of BLI's in group:	0.049191	0.060456	0.041069	0.067315	0.040691	0.068032	
Variance of weighted mean for group:	0.000711	0.028462	0.002895	0.006361	0.000747	0.004062	
Variance adjusted for Finite Universe effect:	0.000029	0.024396	0.002419	0.003379	0.000494	0.003035	0.000227

Dispersion of weighted mean:	0.015076
Mean + 1 standard deviation:	0.7049
Mean - 1 standard deviation:	0.6747

Post Age 65

	(1)	(2)	(3)	(4)	(5)	(6)	Total
Weighted mean BLI for group:	0.2340	0.0604	0.2643	0.0603	0.1926	0.1267	0.2008
Variance of BLI's in group:	0.019851	0.022000	0.011883	0.011052	0.015966	0.018178	
Variance of weighted mean for group:	0.000287	0.010357	0.000838	0.001044	0.000293	0.001085	
Variance adjusted for Finite Universe effect:	0.000012	0.008878	0.000700	0.000555	0.000555	0.000811	0.000065

Dispersion of weighted mean:	0.008080
Mean + 1 standard deviation:	0.2089
Mean - 1 standard deviation:	0.1927

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Average Age / Average Service for Mature Populations

Promulgated from Varying Turnover and Retirement Assumptions

	< - - - - - - - - - - - - - - - Average Age - - - - - - - - - - - - - - - ->								
	< - - - - T2 - - - - >			< - - - - T6 - - - - >			< - - - - T10 - - - - >		
Age of New Hires	RA 62	RA 63	RA 64	RA 62	RA 63	RA 64	RA 62	RA 63	RA 64
25	39.94	40.35	40.76	36.96	37.24	37.53	31.02	31.09	31.16
26	40.75	41.16	41.58	37.88	38.18	38.48	32.16	32.23	32.31
27	41.54	41.96	42.38	38.80	39.11	39.42	33.29	33.38	33.47
28	42.32	42.74	43.17	39.71	40.02	40.34	34.43	34.53	34.63
29	43.08	43.51	43.94	40.60	40.93	41.26	35.56	35.68	35.79
30	43.83	44.27	44.70	41.48	41.81	42.16	36.70	36.82	36.95
31	44.57	45.01	45.45	42.34	42.69	43.04	37.82	37.96	38.11
32	45.29	45.74	46.18	43.19	43.55	43.91	38.94	39.10	39.26
33	46.00	46.45	46.90	44.02	44.39	44.77	40.05	40.22	40.40
34	46.69	47.14	47.60	44.84	45.22	45.60	41.14	41.34	41.53
35	47.36	47.82	48.28	45.64	46.03	46.43	42.22	42.43	42.64

	< - - - - - - - - - - - - - - - Average Service - - - - - - - - - - - - - - ->								
	< - - - - T2 - - - - >			< - - - - T6 - - - - >			< - - - - T10 - - - - >		
Age of New Hires	RA 62	RA 63	RA 64	RA 62	RA 63	RA 64	RA 62	RA 63	RA 64
25	14.94	15.35	15.76	11.96	12.24	12.53	6.02	6.09	6.16
26	14.75	15.16	15.58	11.88	12.18	12.48	6.16	6.23	6.31
27	14.54	14.96	15.38	11.80	12.11	12.42	6.29	6.38	6.47
28	14.32	14.74	15.17	11.71	12.02	12.34	6.43	6.53	6.63
29	14.08	14.51	14.94	11.60	11.93	12.26	6.56	6.68	6.79
30	13.83	14.27	14.70	11.48	11.81	12.16	6.70	6.82	6.95
31	13.57	14.01	14.45	11.34	11.69	12.04	6.82	6.96	7.11
32	13.29	13.74	14.18	11.19	11.55	11.91	6.94	7.10	7.26
33	13.00	13.45	13.90	11.02	11.39	11.77	7.05	7.22	7.40
34	12.69	13.14	13.60	10.84	11.22	11.60	7.14	7.34	7.53
35	12.36	12.82	13.28	10.64	11.03	11.43	7.22	7.43	7.64

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Appendix C

Additional Sensitivity Analysis

Extreme Parameter Values Leading to Low Estimates
of the Percentage of Additional SFAS 106 Costs
to be Met from Other Sources

Additional SFAS 106 Costs of
Average Employer with SFAS 106 Liabilities

Labor Supply Elasticity	|<----- 2% ----->|			|<----- 3% ----->|			|<----- 5% ----->|		
	(a)	(b)	(c)	(a)	(b)	(c)	(a)	(b)	(c)
0.0	0.9	12.0	87.1	2.0	17.5	80.5	5.4	27.5	67.1
0.1	3.9	10.0	86.1	6.4	14.6	79.0	12.5	22.8	64.7
0.2	6.7	8.1	85.2	10.6	11.8	77.6	19.4	18.3	62.3
0.3	9.4	6.4	84.2	14.6	9.1	76.3	26.0	13.9	60.1

(a) reflected in GNP-PI
(b) financed by potential reduction in the wage
(c) to be met from other sources

price elasticity of demand = 3.0
share of labor costs in total cost in sector 1 = 0.78
share of labor costs in total cost in sector 2 = 0.78
initial fraction of labor employed in sector 2 = 0.4

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